

International Journal of Primatology

The Official Journal of the International Primatological Society

Volume 19, 1998

The *International Journal of Primatology* is a multidisciplinary journal devoted to basic primatology, i.e., to studies in which the primate is featured as such. To this end, the journal brings together laboratory and field studies from such diverse disciplines as anatomy, anthropology, ethology, paleontology, psychology, sociology, and zoology. The journal publishes high-quality original articles, short articles, and reviews that have been carefully refereed by experts in the field, and also publishes book reviews. The journal aims to provide a forum for research workers and students in the field of fundamental primatology and to expedite communication between them and other scientists interested in nonhuman primates per se. A representation of an aye-aye on a title page denotes an article or book review in which threatened and endangered species of Primates are subjects.

EDITOR

Russell H. Tuttle, Department of Anthropology, The University of Chicago, Chicago, Illinois, USA

EDITORIAL BOARD

Christophe Boesch, Centre Suisse de Recherches Scientifique en Cote d'Ivoire, Abidjan, Republique de Cote d'Ivoire

Matt Cartmill (Editor Emeritus), Duke University Medical Center, Durham, North Carolina, USA

Bernard Chapais, Université de Montreal, Montreal, Québec, Canada

Robert S. Corruccini, Southern Illinois University at Carbondale, Carbondale, Illinois, USA

Carolyn M. Crockett, University of Washington, Seattle, Washington, USA

Frans B. M. de Waal, Emory University, Atlanta, Georgia, USA

Gerald A. Doyle (Editor Emeritus), University of the Witwatersrand, Johannesburg, South Africa

Alejandro Estrada, Universidad Nacional Autonoma de Mexico, Mexico D.F., Mexico

Linda M. Fedigan, University of Alberta, Edmonton, Alberta, Canada

Jack Fooden, Field Museum of Natural History, Chicago, Illinois, USA

Annie Gautier-Hion, Station Biologique de Paimpont, Plélan le Grand, France

Kenneth Glander, Duke University Medical Center, Durham, North Carolina, USA

Sarah Gouzoules, Yerkes Regional Primate Research Center, Lawrenceville, Georgia, USA

Colin P. Groves, Australian National University, Canberra City, Australia

A. H. Harcourt, University of California, Davis, California, USA

Gottfried Hohmann, Max Planck Institut für Verhaltensphysiologie, Seewiesen, Germany

G. Isabirye-Basuta, Makerere University Biological Field Station, Kampala, Uganda

Hidemi Ishida, Kyoto University, Kyoto, Japan

Alison Jolly, Princeton University, Princeton, New Jersey, USA

Iqbal Malik, University of Delhi, New Delhi, India

Jonathan Marks, Yale University, New Haven, Connecticut, USA

William C. McGrew, Miami University, Oxford, Ohio, USA

John C. Mitani, The University of Michigan, Ann Arbor, Michigan, USA

Fatima Mturi, University of Dar es Salaam, Dar es Salaam, Tanzania

Leanne T. Nash, Arizona State University, Tempe, Arizona, USA

Toshisada Nishida, Kyoto University, Kyoto, Japan

John E. Oates, City University of New York, New York, New York, USA

Madame Berthe Rakotosamimanana, Université d'Antananarivo, Antananarivo, Madagascar

Peter S. Rodman, University of California, Davis, California, USA

Ernesto Rodriguez Luna, Universidad Veracruzana, Xalapa, Veracruzana, Mexico

Thelma Rowell, University of California, Berkeley, California, USA

Duane M. Rumbaugh, Georgia State University, Atlanta, Georgia, USA

Michelle L. Sauther, University of Colorado at Boulder, Boulder, Colorado, USA

Sandra Snook, Searle Research and Development, Skokie, Illinois, USA

Charles Snowdon, University of Wisconsin, Madison, Wisconsin, USA

Pekka Soini, Proyecto Peruano de Primates, Iquitos, Peru

Karen B. Strier, University of Wisconsin, Madison, Wisconsin, USA

Thomas T. Struhsaker, University of Florida, Gainesville, Florida, USA

Jito Sugardjito, The Indonesian Institute of Sciences, Bogor, Indonesia

Robert W. Sussman, Washington University, St. Louis, Missouri, USA

Caroline E. G. Tutin, University of Stirling, Stirling, Scotland

Carel P. Van Schaik, Duke University, Durham, North Carolina, USA

David P. Watts, University of Michigan, Ann Arbor, Michigan, USA

Sarah Antonio-Blangero, Southwest Foundation for Biomedical Research, San Antonio, Texas, USA

Juichi Yamagiwa, Kyoto University, Sakyo, Kyoto, Japan

Zhao Qi-Kun, Kunming Institute of Zoology, Kunming, Yunnan, People's Republic of China

International Journal of Primatology is published bimonthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013.

International Journal of Primatology is abstracted or indexed in Anthropological Literature, Biosciences, Current Contents, Current Primate References, PRIMATES Database, Psychological Abstracts, and Referativnyi Zhurnal. © 1998 Plenum Publishing Corporation. *International Journal of Primatology* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$15.00 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0164-0291/98 \$15.00

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013—telephone (212) 620-8495 and fax (212) 647-1898.

Subscription inquiries and subscription orders should be addressed to the publisher at Subscription Department, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013 or faxed to the Subscription Department at its number (212) 807-1047, or may be telephoned to the Subscription Department's Journal Customer Service at (212) 620-8468, -8470, -8472, or -8082. Subscription rates:

Volume 19, 1998 (6 issues) \$425.00 (outside the U.S., \$495.00). Price for individual subscribers certifying that the journal is for their personal use, \$65.00 (outside the U.S., \$76.00).

Volume 20, 1999 (6 issues) \$475.00 (outside the U.S., \$555.00). Price for individual subscribers certifying that the journal is for their personal use, \$69.00 (outside the U.S., \$81.00).

Periodicals postage paid at New York, N.Y., and at additional mailing offices. Postmaster: Send address changes to *International Journal of Primatology*, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013.

Printed in the USA.

International Journal of Primatology is published bimonthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. Subscription orders should be addressed to the publisher. Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013—telephone (212) 620-8495 and fax (212) 647-1898. *International Journal of Primatology* is abstracted or indexed in Anthropological Literature, Biosciences, Current Contents, Current Primate References, PRIMATES Database, Psychological Abstracts, and Referativnyi Zhurnal. © 1998 Plenum Publishing Corporation. *International Journal of Primatology* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$15.00 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0164-0291/98 \$15.00

CONTENTS

Global Primatology in a New Millennium <i>Russell H. Tuttle</i>	1
Social Organization and Range Use in the Yunnan Snub-Nosed Monkey <i>Rhinopithecus bieti</i> <i>R. C. Kirkpatrick, Y. C. Long, T. Zhong, and L. Xiao</i>	13
Postconflict Affiliation and Stress-Related Behavior of Long-Tailed Macaque Aggressors <i>Marjolijn Das, Zsuzsa Penke, and Jan A. R. A. M. van Hooff</i>	53
Infanticide in <i>Propithecus diadema edwardsi</i> : An Evaluation of the Sexual Selection Hypothesis <i>Elizabeth M. Erhart and Deborah J. Overdorff</i>	73
Paternity in Sooty Mangabeys <i>D. A. Gust, T. McCaster, T. P. Gordon, W. F. Gergits, N. J. Casna, and H. M. McClure</i>	83
Genetic Variation in Remnant Populations of the Woolly Spider Monkey (<i>Brachyteles arachnoides</i>) <i>Theresa R. Pope</i>	95
Percussive Foraging: Stimuli for Prey Location by Aye-Ayes (<i>Daubentonia madagascariensis</i>) <i>Carl J. Erickson, Stephen Nowicki, Luke Dollar, and Nathan Goehring</i>	111
Aimed Throwing as a Means of Food Transfer Between Tufted Capuchins (<i>Cebus apella</i>) <i>Gregory Charles Westergaard, Heather E. Kuhn, Mindy A. Babitz, and Stephen J. Suomi</i>	123
Hand Preference in Free-Ranging White-Throated Capuchins (<i>Cebus capucinus</i>) in Costa Rica <i>Melissa A. Panger</i>	133
How Precisely Do Bonobos (<i>Pan paniscus</i>) Grasp Small Objects? <i>Marianne I. Christel, Stefanie Kitzel, and Carsten Niemitz</i>	165
Book Review: <i>Ecology of an African Rain Forest</i>	195
Book Review: <i>The Evolving Female. A Life-History Perspective</i>	199

CONTENTS

Obituary: Prudence Hero Napier (1916-1997) <i>Colin P. Groves</i>	203
Survey of Grauer's Gorillas (<i>Gorilla gorilla graueri</i>) and Eastern Chimpanzees (<i>Pan troglodytes schweinfurthi</i>) in the Kahuzi-Biega National Park Lowland Sector and Adjacent Forest in Eastern Democratic Republic of Congo <i>Jefferson S. Hall, Lee J. T. White, Bila-Isia Inogwabini, Ilambu Omari, Hilary Simons Morland, Elizabeth A. Williamson, Kristin Saltonstall, Peter Walsh, Claude Sikubwabo, Dumbo Bonny, Kaleme Prince Kiswele, Amy Vedder, and Kathy Freeman</i>	207
Biogeographic Predictors of Genetic Diversity in Populations of Eastern African Chimpanzees (<i>Pan troglodytes schweinfurthi</i>) <i>Tony L. Goldberg</i>	237
Individual Identification and Paternity Determination in Chimpanzees (<i>Pan troglodytes</i>) Using Human Short Tandem Repeat (STR) Markers <i>John J. Ely, Daniel L. Gonzalez, Amber Reeves-Daniel, and William H. Stone</i>	255
Microsatellite Variation in Two Populations of Free-Ranging Yellow Baboons (<i>Papio hamadryas cynocephalus</i>) <i>D. St. George, S. M. Witte, T. R. Turner, M. L. Weiss, J. Phillips-Conroy, E. O. Smith, and J. Rogers</i>	273
Group Size and Composition of <i>Colobus guereza</i> in Kyambura Gorge, Southwest Uganda, in Relation to Chimpanzee Activity <i>Oliver Krüger, Edda Affeldt, Marian Brackmann, and Kirsten Milhahn</i>	287
Proximal Spacing Between Individuals in a Group of Woolly Monkeys (<i>Lagothrix lagotricha</i>) in Tinigua National Park, Columbia <i>Pablo R. Stevenson</i>	299
Effects of Fruit Patch Availability on Feeding Subgroup Size and Spacing Patterns in Four Primate Species at Tinigua National Park, Columbia <i>Pablo R. Stevenson, Marcela J. Quiñones, and Jorge A. Ahumada</i>	313
Population Variation in Patch and Party Size in Muriquis (<i>Brachyteles arachnoides</i>) <i>Pedro Luís Rodrigues de Moraes, Oswaldo de Carvalho, Jr., and Karen B. Strier</i>	325
Fruit Finding by Mangabeys (<i>Lophocebus albigena</i>): Are Monitoring of Fig Trees and Use of Sympatric Frugivore Calls Possible Strategies? <i>William Olupot, Peter M. Waser, and Colin A. Chapman</i>	339
Selectivity and Variability in the Diet of Milne-Edwards' Sifakas (<i>Propithecus diadema edwardsi</i>): Implications for Folivory and Seed-Eating <i>Claire A. Hemingway</i>	355
Book Review: <i>What Young Chimpanzees Know About Seeing</i>	379

CONTENTS

Special Issue: *Alouatta*

Introduction <i>Margaret R. Clarke</i>	383
Population Characteristics of Howlers: Ecological Conditions or Group History <i>Colin A. Chapman and Sophia R. Balcomb</i>	385
Growth of Mantled Howler Groups in a Regenerating Costa Rican Dry Forest <i>Linda M. Fedigan, Lisa M. Rose, and Rodrigo Morera Avila</i>	405
Agonistic and Affiliative Relationships of Adult Female Howlers (<i>Alouatta palliata</i>) in Costa Rica Over a 4-Year Period <i>Evan L. Zucker and Margaret R. Clarke</i>	433
Infant-Nonmother Interactions of Free-Ranging Mantled Howlers (<i>Alouatta palliata</i>) in Costa Rica <i>Margaret R. Clarke, Kenneth E. Glander, and Evan L. Zucker</i>	451
Relation of Intergroup Variation in Allogrooming to Group Social Structure and Ectoparasite Loads in Red Howlers (<i>Alouatta seniculus</i>) <i>Marcelo R. Sánchez-Villagra, Theresa R. Pope, and Viviana Salas</i>	473
Parasites of Wild Howlers (<i>Alouatta</i> spp.) <i>Michael Stuart, Vickie Pendergast, Susan Rumpf, Suzanne Pierberg, Lisa Greenspan, Kenneth Glander, and Margaret Clarke</i>	493
Physiological Ecology of Howlers (<i>Alouatta</i>): Energetic and Digestive Considerations and Comparison with the Colobinae <i>Katherine Milton</i>	513
Conservation Biology of the Genus <i>Alouatta</i> <i>Carolyn M. Crockett</i>	549
Effective Solutions for Howler Conservation <i>Robert H. Horwich</i>	579
Aboreal Quadrupedism and Forelimb Articular Anatomy of Red Howlers <i>Miguel A. Schön Ybarra</i>	599
Skeletal Pathologies in a Population of <i>Alouatta palliata</i> : Behavioral, Ecological, and Evolutionary Implications <i>David DeGusta and Katherine Milton</i>	615

CONTENTS

- Long-Term Habitat Use by Mountain Gorillas (*Gorilla gorilla beringei*). 1. Consistency, Variation, and Home Range Size and Stability 651
David P. Watts
- Long-Term Habitat Use by Mountain Gorillas (*Gorilla gorilla beringei*). 2. Reuse of Foraging Areas in Relation to Resource Abundance, Quality, and Depletion 681
David P. Watts
- Intertroop Transfer and Dominance Rank Structure of Nonnatal Male Japanese Macaques in Yakushima, Japan 703
Shigeru Suzuki, David A. Hill, and David S. Sprague
- Comparative Perspectives in Bimaturism, Ontogeny, and Dimorphism in Lemurid Primates 723
Steven R. Leigh and Carl J. Terranova
- Menopause in Free-Ranging Rhesus Macaques: Estimated Incidence, Relation to Body Condition, and Adaptive Significance 751
Rodney L. Johnson and Ellen Kapsalis
- Social Behavior of Black-Handed Spider Monkeys (*Ateles geoffroyi*) Reared as Home Pets 767
C. Anaya-Huertas and R. Mondragón-Ceballos
-

CONTENTS

Different Population Dynamics of <i>Microcebus murinus</i> in Primary and Secondary Deciduous Dry Forests of Madagascar <i>Jörg Ganzhorn and Jutta Schmid</i>	785
Tree Holes Used for Resting by Gray Mouse Lemurs (<i>Microcebus murinus</i>) in Madagascar: Insulation Capacities and Energetic Consequences <i>Jutta Schmid</i>	797
Group Size, Home Range Use, and Seasonal Variation in the Ecology of <i>Eulemur mongoz</i> <i>Deborah J. Curtis and Alphonse Zaramody</i>	811
Differences Between Vervets (<i>Cercopithecus aethiops</i>) and Patas Monkeys (<i>Erythrocebus patas</i>) in Agonistic Interactions Between Adult Females <i>Lynne A. Isbell and Jill D. Pruett</i>	837
Group Composition Affects Seasonal Birth Timing in Captive Japanese Macaques <i>Roberto Cozzolino and Gabriele Schino</i>	857
Primate Faunivores: Physical Properties of Prey Items <i>S. G. Strait and J. F. V. Vincent</i>	867
Scientific Nomenclature of the Red Howlers from the Northeastern Amazon in Brazil, Venezuela, and the Guianas <i>Anthony B. Rylands and Douglas Brandon-Jones</i>	879
Book Review: <i>Primate Conservation: The Role of Zoological Parks</i>	907
Book Review: <i>Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation</i>	911
Book Review: <i>Conservation of Endangered Species in Captivity: An Interdisciplinary Approach</i>	915
Book Review: <i>Planning, Proposing, and Presenting Science Effectively</i>	919
Book Review: <i>Neotropical Rainforest Mammals: A Field Guide, 2nd ed.</i>	921
Book Review: <i>Primates: The Amazing World of Lemurs, Monkeys, and Apes</i>	923

CONTENTS

Special Issue: Seasonality in the Great Apes

The Importance of Seasonality in Primatology <i>Frances J. White</i>	925
Seasonality in the Ecology and Life Histories of Mountain Gorillas (<i>Gorilla gorilla beringei</i>) <i>David P. Watts</i>	929
Dietary Response of Chimpanzees and Cercopithecines to Seasonal Variation in Fruit Abundance. I. Antifeedants <i>Richard W. Wrangham, Nancy Lou Conklin-Brittain,</i> <i>and Kevin D. Hunt</i>	949
Dietary Response of Chimpanzees and Ceropithecines to Seasonal Variation in Fruit Abundance. II. Macronutrients <i>Nancy Lou Conklin-Brittain, Richard W. Wrangham,</i> <i>and Kevin D. Hunt</i>	971
Factors Affecting Party Size in Chimpanzees of the Mahale Mountains <i>Akiko Matsumoto-Oda, Kazuhiko Hosaka, Michael A.</i> <i>Huffman, and Kenji Kawanaka</i>	999
Seasonality and Socioecology: The Importance of Variation in Fruit Abundance to Bonobo Sociality <i>Frances J. White</i>	1013
Population Dynamics of Wild Bonobos (<i>Pan paniscus</i>) at Wamba <i>Takeshi Furuichi, Gen'ichi Idani, Hiroshi Ihobe, Suehisa</i> <i>Kuroda, Koji Kitamura, Akio Mori, Tomoo Enomoto,</i> <i>Naobi Okayasu, Chie Hashimoto, and Takayoshi Kano</i>	1029
Habitat Use and Ranging of Wild Bonobos (<i>Pan paniscus</i>) at Wamba <i>Chie Hashimoto, Yasuko Tashiro, Daiji Kimura, Tomoo</i> <i>Enomoto, Ellen J. Ingmanson, Gen'ichi Idani, and</i> <i>Takeshi Furuichi</i>	1045
Changes in Orangutan Caloric Intake, Energy Balance, and Ketones in Response to Fluctuating Fruit Availability <i>Cheryl D. Knott</i>	1061
